

REMARKS

Claims 1-6 are pending in the present application, claims 7-11 having been cancelled herein. The Office Action and cited references have been considered. Favorable reconsideration is respectfully requested.

The disclosure was objected to due to a number of informalities. These have been corrected along with others noted by Applicant. Withdrawal of the objection is respectfully requested.

The objection to claim 8 is rendered moot by the cancellation of that claim.

The title was objected to as being not descriptive of the claimed invention. A new title is proposed which is believed to be descriptive. Withdrawal of the objection is respectfully requested.

The drawings were objected to because the reference numerals 34 and 36 did not match the specification. Rather than amending the drawings, Applicants have amended the specification to conform to the reference numerals used in the drawings. Withdrawal of this objection is respectfully requested.

Claims 1, 4, 5 and 6 were rejected under 35 U.S.C § 102(b) as being anticipated by Mamin et al. (U.S. Patent No. 6,055,220). Claims 1, 2 and 4-11 were rejected under 35 U.S.C § 102(b) as being anticipated by Tominaga et al. (U.S. Patent No. 6,661,745). Claim 3 was rejected under 35 U.S.C § 103 as being unpatentable over Mamin and further in view of Reece (US. Patent No. 4,352,872). These rejections are respectfully traversed for the following reasons.

With respect to claims 7-11, the rejections are moot in view of the cancellation of those claims.

Claim 1 recites a near-field optical flying head for near-field recording on a disk, including, *inter alia*, a carrier maintained in a near-field distance from the surface of the disk to be recorded and a solid immersion lens of semispherical shape installed in one side of the carrier facing the disk to be recorded. The solid immersion lens has refraction face facing the disk to be recorded. The head further includes a focusing lens installed in the carrier and spaced from the solid immersion lens at an inner side, adapted to focus a laser beam onto the solid immersion lens, enabling a part of electromagnetic wave to pass through the refraction face and to make a near-field exposure to the disk to be recorded the solid immersion lens comprises a light scattering layer plated on the refraction face, releases silver atoms to enhance the electromagnetic wave passing through the refraction face by providing a small optical aperture for the passing of the electromagnetic wave when light energy is received and reduces to an original compound after disappearance of the light energy, and a dielectric layer plated on the light scattering layer and adapted to prohibit escaping of gas which is generated during chemical reaction of the light scattering layer. The light scattering layer is made of one of a series of AgX (silver halide) compounds. This is not taught, disclosed or made obvious by the prior art of record.

In Mamin, the solid immersion lens (SIL) is coated with an opaque film at its planar surface 202 and is provided with an aperture formed thereon. Alternatively, the SIL includes a scatterer (metallic spherically-shaped particle or circular dot) on the planar surface 202. However, each of the aperture and the

scatterer is required to be sub-wavelength-sized. Thus, the high-cost nano-lithography processes, such as electron beams or focus ion beams, are required.

Further, it is a difficult process to form a precise size of the aperture. In the present invention, the aperture is automatically formed by directly projecting the laser beam on the scattering layer of the SIL coated with the silver halide without a nano-lithography process, or multiple processes of forming the aperture. Thus, the present invention overcomes the difficult process of forming the precise size of the aperture, thereby dramatically reducing the production cost and increasing the productive capacity.

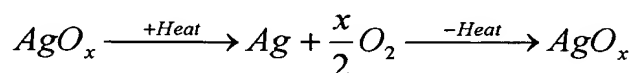
In addition, the aperture or the scatterer of Mamin patent is produced in advance to have a sub-wavelength size, and after the near-field optical flying head is made, the process of the optical path alignment of the aperture will be required. The aperture or the scattering silver metallic particles of the present invention is naturally produced by the laser beam's projection, such that problems with optical path alignment will not occur.

Furthermore, the process of producing the scattering silver metallic particles is apparently different from that of the present invention. The silver metallic particles of Mamin are produced by the nano-lithography engraving. In contrast, according to the present invention, the silver metallic particles are automatically produced by the laser beam's projection on the planar surface of the SIL of the scattering layer of silver halide, such that the size of the silver metallic particles is more controllable and more further easily microminiaturized than in Mamin.

For at least these reasons, Applicant respectfully submits that claim 1 is patentable over the Mamin patent.

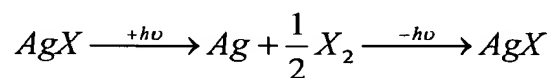
Claims 4, 5 and 6 depend from and include the recitations of claim 1. Applicant respectfully submits that claims 4, 5 and 6 are patentable in and of themselves and as they depend from and include the recitations of claim 1 which is patentable for the reasons discussed above.

With respect to the rejection over the Tominaga patent, "thermal super resolution" is introduced by Tominaga and its chemical equation is as follows.



It is specified that the laser beam is projected on the scattering layer of silver oxide for a while for accumulation of heat energy to form a sub-micro aperture and to dissociate the silver atoms. However, there are two drawbacks for such process; it takes a longer time for the reaction to form the sub-micro aperture by the accumulation of the heat energy. Particularly, as the laser beam's projection lasts for a longer time, the heat energy keeps accumulating to cause the aperture to keep enlarging, and thus, the near-field flying head is required to continue working, i.e. the continuing projection of the laser beam causes a great defect in practice of application field.

In the present invention, "optical super resolution" is introduced therein and its chemical equation is as follows.



Such process is similar to the theorem of image formation of photo film, i.e. the scattering layer of the silver halide is only under the projection the laser beam of particular wavelength to cause the transfer between transparency and opacity to

further produce the aperture. Because the silver atoms are dissociated from the silver halide by "optical super resolution", the reaction time of such process is shorter than that of Tominaga. Further, the greatest advantage of such process is that the aperture will not keep enlarging as the laser beam keeps projection. Briefly, the aperture of the silver oxide will keep enlarging as the laser beam keeps projecting but the aperture of the silver halide will not.

For at least these reasons, Applicant respectfully submits that claim 1 is patentable over the Tominaga et al. patent.

Claims 2 and 4-6 depend from and include the recitations of claim 1. Applicant respectfully submits that claims 2 and 4-6 are patentable in and of themselves and as they depend from and include the recitations of claim 1 which is patentable for the reasons discussed above.

With respect to the rejection under 35 U.S.C. § 103, the silver halide taught by Reece is used for the stabilization of latent images. Accordingly, silver halide taught by that patent is different in purpose and function from that of the present invention. One of ordinary skill in the art would not have been motivated to use the silver halide composition of Reece for the light scattering layer of Mamin. There is nothing in the prior art of record that would suggest to one of ordinary skill in the art that it would be desirable to release silver atoms of a light scattering layer in the device of Mamin. For at least these reasons, Applicant respectfully submits that claim 3 is patentable over the prior art of record whether taken alone or in combination as proposed in the Office Action.

In view of the above amendments and remarks, Applicant respectfully requests reconsideration and withdrawal of the outstanding rejections of record.


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Applicant submits that the application is in condition for allowance and early notice to this effect is most earnestly solicited.

If the Examiner has any questions he is invited to contact the undersigned at 202-628-5197.

Respectfully submitted,

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